

CONNECTING LINKS.

Read before the Hamilton Association, February 12th, 1891.

BY H. B. SMALL.

The term "Connecting Links," might perhaps, with more propriety, be expressed under the wider term development, or the state of progression from one phase or class to another.

As an example of this, take the infant and the man. There is little in common between these two stages, save form and existence. But trace the various intermediate stages to see the links of development. The first movements of an infant are automatic and directed solely to the supply of its physical wants. New sensations are constantly excited by surrounding objects, which call into exercise all the dormant powers of mind: notions are acquired of the character and position of external objects. An attachment to persons and places begins to manifest itself. As the child advances in age the power of observation is strengthened, the perceptions become more distinct, the powers of reflection are called out which prompt him to reason upon the causes of what he observes, and his growing intelligence enables him to direct his actions to the attainment of objects he desires.

Then comes a development of moral feeling, and the *intuitive perceptions* of the lower stage of infancy become, through the connecting links recorded, the *acquired perceptions* of the man.

"Man," says Humboldt, "ever connects on from what lies at hand." Progress, degradation, survival, revival and modification, are all modes of the connection that binds together the complex network of civilization. A glance into the trivial details of daily life shows how we are but transmitters and modifiers of the result of long past ages. In the history of firearms, the clumsy wheel-lock, in which a notched steel wheel was turned by a handle against the flint till a spark caught the priming, led to the invention of the flint lock; that in time passed by an obvious modification into the percussion lock, the gun itself now changing again from muzzle-loading to breech-

loading. The mediæval astrolabe passed into the quadrant, discarded in its turn by sailors for the sextant; and so on through the history of one art and instrument after another.

Books of costume, showing how one garment grew or shrank by gradual stages and passed into another, illustrate the nature of the change and growth, revival and decay, which go on from year to year in more important matters of life. It is only when we fail to see the line of connection that we form the idea of something having been originated.

There is nothing more evident than the fact that man is in every respect of the same nature as the world in which he dwells, that in fact he is a part of it—a part of the *universal whole*; and, descending from man—the highest known state of organized life down to the animate object of the lowest order—all creation is found to be composed of individual members, which collectively form the infinite whole. The line of demarcation here and there may be rugged; seeming chasms exist, to be bridged over by future revelations of science and investigation—but the conclusive result of all research shows everything to be so gradually and yet so intimately connected that it is in some cases a matter of difficulty to discriminate where one terminates and another begins. All nature may be said to be bound together by a series of connecting links, which conjointly form the chain of unity and point to the grand idea of harmony which pervaded creation at its birth.

Our subject might be extended to all the sciences; to the various branches of learning, including that highest branch of all, mathematics; to music and harmony, or the sweet blending of sounds; to geology; to chemistry; in fact, to everything whose collective parts form unity: but I must to-night limit it to two branches—links of mind, individual and ethnological, and links of matter.

Of the individual links of mind memory stands the foremost; the remembrance of the past, vividly brought before us by some connecting chain of thought, over the links of which the mind bounds at once, till one string so recalls another that the original train of thought is lost, and some past object so prominently recalled that it occupies the attention to the exclusion of all else. Who amongst us to-night, from some chance meeting, from the passage of some well-known author, from the sight of a trifling object, has not recalled scenes and phases of early life and days of childhood long since for-

gotten, and only evoked by some chord of memory being touched. The accidents of life, places, flowers and names, all act as mind links, mementos of the past. A recent writer on "mental physiology," styles memory the "organic registration of the effects of impressions." The character in which organic changes are written may be said to be indelible, and in a brain not disordered, the records of memory are stereotyped. To recall them to consciousness may be beyond our power; we may think they are lost to us forever, till something occurs to alter to an appreciable degree the minute nerve cells of the brain, and thus to tear off the veil which hid from us the thoughts and events of the past.

Dreams are another connecting link, recalling at times long forgotten scenes and faces, memories of bygone times which the storehouse of memory unearths without any apparent reason. If it were possible to trace a dream to its origin, some chance remark, some word or act, not noticed at the time, has touched a chord of memory which continues to vibrate in the nervous state after sleep has sealed the body in repose, till all at once it flashes on the mind, sometimes dimly, like objects in a fog, and forgotten directly, or else so lifelike that it seems to be the cause of the sleeper awaking.

There is another connecting mind link, undefinable, yet plainly manifesting itself, which, for want of a proper term, may be styled sympathetic attraction. I do not mean, by this, biology or mesmeric influence, which themselves seem connecting links, but the mutual reciprocation of mind existing between different individuals, whose unity of thought and intellect run side by side, and whose ideas seem to have been fashioned in the same mould.

Psychology, in itself, would form a subject for a lecture, and I have only introduced the above branches of it as a prelude to the ethnological division of mind links, on which we will dwell at greater length. Foremost amongst these stands Mythology.

There is a striking similarity in the early records or legends of all nations that plainly shows the connecting link that binds together all the races of the human family. Oral tradition, doubtless, had much to do with this. The classic legend of the Golden Age evidently had the same origin as the history of Paradise. The Fall of Man may be traced in the story of Pandora, the first woman, who is represented as having, through curiosity, opened a forbidden box in the house of her husband, Epimetheus. When she raised the lid,

memory being touched. All act as mind links, mental physiology," effects of impressions." It may be said to be records of memory are may be beyond our power, till something excite nerve cells of the brain to us the thoughts

falling at times long intervals, the times which the parent reasor. If it is a chance remark, it touched a chord of our state after sleep washes on the mind, often directly, or else deeper awaking. Definable, yet plainly a term, may be styled biology or mesmeric links, but the mutual individuals, whose ideas seem

for a lecture, and I is a prelude to the will dwell at greater glory.

words or legends of that binds together tion, doubtless, had the Golden Age evidence. The Fall of the first woman, who is the forbidden box in she raised the lid,

all the evils incidental to man flew out, and only by quickly shutting down the lid did she manage to retain and prevent the escape of Hope. The promise of recovery, through the destruction of the serpent, may be traced in various legends, classical and eastern, where the serpent or dragon is introduced. Hercules slaying the dragon in the garden of the Hesperides, and Apollo killing the python, may have derived their origin from this source. The Persian sacred books, the Zendavesta, contain so similiar an account to our own, of the Fall of Man, that it is generally conceded that Zoroaster, the compiler of them, must have derived it from Moses. Connected doubtless with the Biblical legend of the Fall of Man, serpent worship took its rise, and it seems to have been one of the most universal as well as mysterious superstitions among the primeval religions of the world. The Phœnicians adored this reptile as the genius of beneficent knowledge, the Chinese use it to this hour as a symbol of wisdom, and paint their Kings of Heaven—the Tien Hoangs—with snake bodies. As the sign of the sun, of eternity, and of the art of healing, we encounter the serpent in Arabic, Chaldean and Roman lore. The woman at Endor is called in Scripture, "Ob," that is the serpent; and the name Endor itself, means "the oracle of Ador," who was identical with the Canaanite snake-god Addir. Evœe, again the classic cry of the Moenad priestesses, whose heads were wreathed with snakes, is thought to be derived from Ophis, the Greek word for the creature. At Colchis, at Thebes, at Delphi, we have stories of sacred serpents; the Greeks called Apollo himself "Python," and before the days of the Greeks, the Egyptians carved the asp upon their temples, embalmed it and ornamented the tiara of Isis with it. The priests also wore the reptiles upon their officiating hats; and indeed, Thermuthis, the snake-god of the Nile, amid the sacred figures of the hieroglyphics is everywhere great and revered. The Chaldeans built the snake city of Ophis or Oubis upon the river Tigris. The Æthiopians are thought to derive their name from "Ath-opes," *i. e.*, worshippers of the serpent. Eubœa means "snake island," and one of the earliest heresies of the Christian Church was that of the Ophites. In a word, look where we will, historical vestiges occur of this intense and venerating worship of what we regard as the most base and malignant thing in nature.

Among the Hindoos, the king of evil demons is called the King

of Serpents. Krishna, one of the incarnations of the Deity, attacked the serpent and destroyed it, and Hindoo sculpture represents him with his feet on the serpent's head. Dr. Deane says, in his treatise on serpent worship: "The progress of the sacred serpent from Paradise to Peru is one of the most remarkable phenomena in mythological history, and to be accounted for only on the supposition that a tradition of the serpent in Paradise has been handed down from generation to generation."

Serpent worship existed amongst the mysteries of the ancient Mexicans. There is in the Vatican, I believe, a remarkable painting originally brought from Mexico, representing a woman in conversation with a serpent erect, to which was attached the Mexican legend that the woman was the mother of mankind, and the serpent the genius of evil. The originality of the painting is further borne out by the existence of a colossal sculpture in that country of a serpent swallowing a woman, to which the same legend is attached.

Serpent worship can be distinctly traced throughout all Asia. Living serpents were kept at Babylon as objects of adoration, and to this the apocryphal story of "Bel and the Dragon" points. All through the east is found in the Temples a mystic representation of a circle with wings and a serpent passing through it. This circle, when filled in with a human face, became the "Medusa" of the Greeks. In Hindoostan to the present day, a custom prevails similar to that spoken of in "Bel and the Dragon," when at the "Festival of Serpents," "Kartik Purnima" night, every man sets by a portion of his rice and saucer of milk, which he offers to the snakes around his quarters as a propitiation to them.

Amongst the Scandinavians and Norsemen of old, their deity "Thor," is represented casting down to the bottom of the sea the great serpent Midgard.

Amongst the ancient Druids the serpent was not omitted, as is shown by the serpentine stone Temple of Abury still remaining, and the Saurian mound at Loch Nell, near Oban in Scotland, identical with similar remains discovered in Ohio and Wisconsin. In Ireland its worship was not without its votaries. Ogmios, the chief object of Celtic worship, was depicted with a huge club with serpents twined round it and surmounted with wings like the *caduceus* of Mercury. Dr. Christmas speaking of the serpent worship in Ireland, says: "There is perhaps more truth in the legend of St. Patrick

the Deity, attacked
ure represents him
ays, in his treatise
sacred serpent from
ble phenomena in
y on the supposition
been handed down

ries of the ancient
remarkable painting
oman in conversa-
the Mexican legend
d the serpent the
further borne out
untry of a serpent
attached.

roughout all Asia.
of adoration, and
gon" points. All
representation of
h it. This circle,
"Medusa" of the
a custom prevails
gon," when at the
t, every man sets
he offers to the
m.

of old, their deity
m of the sea the

not omitted, as is
ill remaining, and
Scotland, identical
onsin. In Ireland
the chief object
ub with serpents
ke the *caduceus* of
worship in Ireland,
nd of St. Patrick

than is generally allowed. His banishing by prayer all snakes and venomous reptiles from Ireland, may imply that by disseminating the doctrines of Christianity, he overthrew the worship of the serpent and drove its priests from the island."

This form of worship, I believe, is now confined to the inaccessible tribes of Central Africa and an Abyssinian tribe called the Shangallas, and traces of it are said to be met with amongst the lowest class of Negroes in the Southern States, who hold Obi worship once a year in the densest part of the forest and the swamp.

The Hindoos have a tradition evidently connected with the creation of man and the subsequent death of Abel at the hands of Cain. Brahma becoming incarnate, produced the first man out of one half of his body, and the first woman out of the other half. From this pair were born three sons, two of whom quarrelling, one wished the other might be a wanderer on the face of the earth, whereupon, his brother incensed at this slew him with a club whilst performing a sacrifice.

A remarkable legend exists amongst the Iroquois Indians, that the first woman was seduced from her allegiance to God, and on this account banished from Heaven. Afterwards she bore two sons, one of whom, in consequence of a quarrel, took a club and slew the other. But from the same woman sprang many men and women, who were the progenitors of the whole human race.

The fable of Uranus, the first civilizer of men, and his eldest son, Hyperion, being slain by his brethren out of envy, is thought by mythologists to show a connection with the Scriptural account of Abel, whilst some again include under this connection the fable of the Corybantes, three brothers, one of whom was murdered by the other two. Doubtless each legend had its basis in the same origin and from one source.

Take again, as another connecting link of mythology, the deluge. Everywhere the tradition exists, amongst all the Nations of antiquity, amongst the Indians of our own land, the Mexicans, the South Sea Islanders, the Asiatics, and in fact everywhere, and each race has modified or diversified it according to its own ideas. Plato, in his *Timæus*, gives an Egyptian account of the deluge, on which occasion certain herdsmen and shepherds were saved on the tops of the mountains, but they who dwelt in the plains were swept into the sea by the rising of the waters. In the Hindoo

mythology, the incarnation of Vishnu into a fish, is supposed by Sir Wm. Jones, to bear reference to the deluge. The world having become corrupt and a flood sent to destroy man, the reigning Prince and his family were deemed worthy of preservation, and by command of Vishnu, entered an ark prepared for the occasion called Cahitra. Vishnu took on himself the form of a huge fish, to which the ark was moored by a vast serpent, which being again fastened to the horn of Vishnu, rode securely through the flood.

The Greek and Roman traditions of the deluge are known to every school-boy and do not require mention. The ancient Druidical tradition is handed down through their Bards, as follows: "The profligacy of mankind had provoked the great Supreme to send a pestilential wind upon the earth; a fierce poison descended, every blast was death. At this time the patriarch distinguished for his integrity was shut up, together with his select company, in the enclosure with a strong door. Presently a tempest of fire arose, it split the earth asunder to a great depth. The waves of the sea lifted themselves up around the borders of Britain. The rain poured down, the waters covered the earth and the flood which swept away from the surface of the earth the expiring remains of the patriarch's contemporaries, raised his vessel on high from the ground and bore it safe on the summit of the waves."

The Peruvians had the following account: They believed, by tradition, that it once rained so heavily as to deluge their country. A universal destruction of the human species took place, a few only excepted, who took refuge on the top of a mountain. When the rain ceased they sent out two dogs, which returned covered with mud. After a certain interval they sent out two more dogs, which coming back dry, they concluded the earth was again inhabitable, and leaving the mountains they became the progenitors of the present race of men. The Brazilians have a somewhat similar legend of a man and a woman escaping on a raft. In the Sandwich Islands, all the earth was said to have been covered with water, except one of their mountain peaks, on which one pair of mortals saved themselves from destruction, and from them sprang all the present races.

The Mexican tradition is that a mighty inundation swept from the earth all the generations of man. One man and a woman with their children embarked in a spacious bark, with a great store of provisions, a variety of animals and every sort of grain. In this vast

is supposed by Sir
The world having
the reigning Prince
on, and by command
mission called Cahitra.
to which the ark
fastened to the horn

eluge are known to
The ancient Druid-
is, as follows: "The
Supreme to send a
n descended, every
distinguished for his
company, in the en-
of fire arose, it split
of the sea lifted
e rain poured down,
a swept away from
the patriarch's con-
round and bore it

They believed, by
eluge their country.
k place, a few only
untain. When the
covered with mud.
gs, which coming
habitable, and leav-
f the present race
legend of a man
h Islands, all the
cept one of their
saved themselves
esent races.
lation swept from
nd a woman with
a great store of
rain. In this vast

receptacle they sailed over the deep. At length, when the deities ordered the waters to withdraw, the man sent out a vulture to ascertain the condition of things. This bird, however, feeding on dead flesh, did not return. The man then sent out another messenger, and after dismissing several, the humming-bird alone returned, bearing with it a branch covered with leaves. Perceiving by this that the waters had subsided, the inmates of the bark went forth on Mount Colhuaca. This story is told by Humboldt in his Researches.

In a speech at Birmingham quite recently, Professor Fawcett remarked: "Children who have been taught to read the Bible in an intelligent fashion frequently receive a tacit impression that Jewish history has no point of contact with profane history." But it is very easy to trace, on examination, the connection between many of the heathen gods of the ancients and prominent characters of the Old Testament. For instance, we find Vulcan corresponding with Tubal Cain, Nimrod with Orion, Noah with Deucalion, Moses and the Brazen Serpent with Aesculapius, represented with a stick entwined with snakes, Hercules with Samson, especially in the relation of the former to Omphale, and the latter to Delilah.

The building of the tower of Babel corresponds with the fable of the giants attempting to pile Ossa upon Pelion, and the subsequent confusion and scattering of tongues with the dispersion of the giants. There is a Grecian legend strangely resembling the visit of the two angels to Lot and the subsequent destruction of Sodom. Hermes and Zeus, having visited *incognito* a city on earth, were inhospitably repulsed by the rich and powerful, but were treated with great kindness by an aged couple named Baucis and Philemon, who had retained their virtue when all around were sunk in profligacy. Discovering the divine nature of their visitants from the undiminished quantity and improved quality of the wine in the pitcher out of which they drank, they were about to pay them homage, but were prevented from so doing by the vengeance the deities took on the depraved and inhospitable city. When the old couple, recovering somewhat from their amazement, looked for it, they saw only a stagnant lake, beneath the waters of which the city was plunged. Their cottage was left and changed into a Temple, of which they were appointed Priest and Priestess, and after a long life they were changed into trees overshadowing the structure. Here we see Zeus and Hermes representing the angels, Philemon and Baucis Lot and

his wife, and the change into the trees may be but another version of the change Lot's wife underwent.

A mythological connection has been traced by a French writer, M. Huot, in his *Démonstration Evangelique*, between Bacchus and Moses. Both, he says, were born in Egypt; both were cast into the river; both were educated in Arabia, or resided a considerable time there; both were exiled; Bacchus was ever accompanied by a dog, and the companion of Moses was Caleb, the Hebrew word for dog; therefore, says Dr. Huot, the identity is sufficiently proved.

Many other coinciding characters could be adduced if it were necessary to show the connecting links of mythology with Scriptural traditions.

It is interesting to trace in the various forms of religion, or modes of worship, the connecting link which pervades all, from the rudest form up to enlightened Christianity. The rites of sacrifice, purification and a future life pervade all. The Red Indian believes in his Happy Hunting-grounds; the South Sea Islander in his shadowy Island of Bolotu; for the Greeks of old were the Elysian Fields and Hades; and to the Christian of to-day, the heights of Heaven and the depths of Hell hold forth an expectation of a life to come. A child naturally wonders why the Israelites formed and worshipped a golden calf, when they thought Moses had forsaken them, but it was simply the remembrance of the god form they had seen worshipped in Egypt that suggested it to them. The rites attendant on the Obi worship of the Negroes of the present day, and those attendant on the worship of Astarte and Mylitta, and the later Eleusinian mysteries, are closely allied. Success would never attend a new religion about to be thrust upon the world, without adapting it to the forms of something preceding it, and thus we find each successive form of worship gradually adopting certain practices of the one it was intended to supplant, but showing by these the connecting link pervading all.

Sabaism, or the adoration of the sun, moon and stars, branching off into fire worship, is easily accounted for as a degraded form of that homage to visible Divinity, with which men worshipped the glorious god of day, and bowed down before the heavenly host. It was alluded to by Moses when he said: "Take heed to yourselves, for ye saw no manner of similitude on the day that the Lord spake unto you in Horeb, out of the midst of the fire * * * lest thou

lift up thine eyes unto Heaven, and when thou seest the sun and the moon and the stars, even all the host of Heaven, then shouldst thou be driven to worship them."

Amongst the Medes and Persians of old, fire was worshipped as the element containing and diffusing light, and in special places a perpetual fire was kept up, with certain purifications and ceremonies. The material worship of light and fire was raised in the religion of Ormuzd, their divine being, to a spiritual character, the symbol of higher spiritual purity. For a long period worship was paid simply to the light and fire, as they appeared in nature; the imaginations of the Persians do not seem to have conceived the objects of their worship in definite forms, nor did they invent any mythological stories about them. Sacrifices were offered in the open air and on hills or high places, and Herodotus expressly states that the Persians, in his time, had neither statues nor temples. Idolatry was afterwards introduced but soon disappeared, and its place again supplied by the material worship of fire, and at this stage the religion of Ormuzd has continued to the present day, for the few surviving remnants of the ancient Iranians, called Parsees, still cling to the worship of their ancestors, notwithstanding the furious persecution of the Mohammedans. They are found in some of the eastern parts of Iran, especially in Surate, in Western India, and amongst the Afghans, but their religion has become a coarse mechanical and superstitious fire worship.

Used more or less by all the nations of antiquity, especially of Asia, it was likewise the religious form of worship amongst the Aztecs and Peruvians of this continent, and traces of it yet linger in some of the Indian festivals of the west. Amongst the Aztecs, at the end of every 52nd year, their cycle, a high religious festival in honor of the sun was held, on the eve of which every fire was extinguished, and after an interval of fasting, the ceremony of the new fire was celebrated, the Priests going at midnight to a neighboring mountain, where by means of friction the sacred flame was rekindled, which was to light up the national fires for another cycle. As the sacred flame again blazed on the high altar and was distributed to other shrines, shouts of triumph resounded and a festival lasting 13 days was held, attended with human sacrifices—a sort of jubilee for the recovered flame, type of a regenerated world. Dr. Wilson, in his description of this Aztec ceremony compares it to the Annual

Miracle of the Greek Church in the crypt of the Holy Sepulchre.

Amongst the heathens a feast was held at the Summer Solstice, for three days previous to which a solemn fast was held, the fire on the great Altar of the Sun was allowed to go out and no private fire was kindled. On the fourth day, after various rites of adoration, the sun rays were collected by a priest into a focus by means of a concave mirror, by which a heap of dried cotton was ignited and the Sacred Fire again rekindled direct from the sun. Only when the sky was overcast was friction resorted to by them, but such an event was looked upon to be almost as calamitous as the extinction of the Sacred Fire, which it was the duty of the Virgins of the Sun to guard. Here again can be traced a link connecting with the Vestal Virgins of early Rome.

Amongst some of the Indian tribes traces of the Annual Festival of Fire are discernible in their New Year's Dog Feast, extending over six days, during which two "Keepers of the Faith" visit each Lodge and perform the ceremony of stirring the ashes on the hearth, accompanied with thanksgiving to the Great Spirit. On the fifth day a fire is solemnly kindled by friction, and on it at sunrise is sacrificed a white dog as a propitiation to Manitou. Traces of Fire and Sun worship still linger in Europe, in the Beltan fires of Ireland and the Channel Islands on St. John's Eve, the Summer Solstice, in the Easter Bonfires of Germany, the Yule Log of Xmas, the Winter Solstice, and in the peasant of Saxony and Brandenburg climbing the hill-tops on Easter morning to see the sun rise, whilst it is also thought that the hymn or carol sung by chorister boys in the tower of Magdalen College, Oxford, at sunrise on May-day, is but a remnant of the adoration of the sun handed down by the Druids.

The monumental records of antiquity, in the form of cromlechs, pillars of stone, obelisks and sculptured stones, are a link that enables the Archæologist to trace the connection of early nations and point to Asia as the cradle of the human race.

Dr. Wise, in a paper read before the Royal Society of Edinburgh, in 1855, ably demonstrates the general identity of the ancient monuments of S. and W. Europe with those of Hindostan, proving it by the physical conformation of the races who inhabit those widely distant countries, by the similarity of many of their manners, customs and observances, and by the decided and extensive affinities

of the Celtic and other languages of W. Europe with the Sanscrit, which afford as strong an evidence as we can be expected to obtain of a connection so remote between races so widely separated. Dr. Wise says that the names of mountains, rivers and other great natural features of the south and west of Europe, bear evidences of its having been in the possession of a Celtic race anterior to the earliest date of authentic history, and this early connection indicates a line of enquiry by which much of the obscurity resting over the earliest monuments and history of Europe may be cleared away. May not the same test be applied to the monumental records of the race long passed away on this continent, prior to the Indian, known to us as the "Mound Builders," and whose cyclopean works have survived in the ruined cities of Central America, and are regarded by even the native tribes there, with such superstitious awe that they avoid frequenting them in any way? Some of these mounds and stone records, along their line of advance southward, bear a striking resemblance to the Druidical circles, and would thus point to one common origin.

Dr. Wise says the general identity in idea and design of the European monuments with those of Hindostan, is so marked as to justify the inference that races of Asiatics proceeded westward at different ages, and established themselves along the shores of the Baltic and Mediterranean, and part of the Atlantic coast, along which they have left characteristic monuments, which resemble those of their original country. These races appear to have proceeded westward by Scythia and Scandinavia on the one hand, and by the shores of the Mediterranean on the other. We find the same cromlechs and pillar stones in Circassia, Tartary, Asia Minor, Sardinia, the Atlantic shores of Spain, Gaul and the British Isles. May not another exodus have taken place eastward from Asia across the Behring Straits to the American Continent, and proceeded southwards along the line of mounds which remain as landmarks of their route, and which may become, in the hands of Archaeologists, connecting links to prove the identity of their builders with a Hindoo ancestry, just as the sun worship of Peru and Mexico, which I have described, is a remnant and the connecting link with the fire worship of Assyria, Chaldea and Persia, and of the rites of Moloch and Baal? In connection with this, Dr. Wilson says in his "Prehistoric Man," the worship of the Sun, though associated with ancient rites of

Asiatic nations, is not *necessarily* an evidence of the eastern origin of the nations of the New World. But in the services to which it gave rise, we have at least suggestive hints of the links that bind together its ancient and modern tribes ; perhaps, also, they may supply a clue to the interpretation of some of the obscure sculptures, with their mysterious hieroglyphics, still remaining on sites of the extinct native civilization of America, and of rites once practised amid the sacred enclosures, and on the altar mounds which give such peculiar interest to the river terraces of the Mississippi Valley.

In tracing the personification of the deities of old, the link that connected such personification with the ideas of the instituters of Heathen worship is easily distinguishable. In the early days of Greece, for instance, the division of the deities contained only those emblematic of the forms, properties and powers of nature, and next the impersonation of the qualities of the mind. The first were the natural result of the awe that filled the mind when it observed the mysterious changes perpetually going on in the world around, the apparent agency of something giving fertility to the earth and motion to the wind and sea. The dogma of that was "*Jupiter est quodcunque vides.*" And of this deification of the all, the deification of the parts was a natural consequence. Pantheism led to Polytheism. So the powers of nature were worshipped under various forms and with various rites, consonant to their supposed attributes, and the idea of the *existence* of such beings was so brought to the minds of the people that at length representations of these unseen agents, fashioned as the mind would naturally personify them, were made.

As years rolled on and man passed from the contemplation of material forms to that of spiritual phenomena, and when the principles of social existence began to be understood, then it became necessary to typify the qualities of the mind. To this we may trace Apollo, the patron of learning ; Minerva, the legend of whose birth typified a blending together of the characteristic influence of the sexes, masculine strength and female beauty. And so could we trace one by one the attributes that connected each deity with the form assigned to it, the connecting link in the mind of that cultured race that coupled the ideal with the character and propensities of the time.

Language is another of the connecting links of nations.

the eastern origin of
ces to which it gave
s that bind together
ey may supply a clue
ulptures, with their
of the extinct native
ed amid the sacred
give such peculiar
alley.

es of old, the link
s of the instituters
In the early days of
contained only those
of nature, and next

The first were the
en it observed the
e world around, the
to the earth and
at was "*Jupiter est*
e all, the deification
Panthetism led to
ipped under various
upposed attributes,
s so brought to the
ns of these unseen
ersonify them, were

the contemplation of
a, and when the
nderstood, then it
mind. To this we
erva, the legend of
characteristic influ-
e beauty. And so
nnected each deity
in the mind of that
character and pro-

of nations.

I think it was Dante who makes Adam enunciate the notion that there is no primitive language of man to be found existing upon earth, but the connecting links of language which can be traced in the words of all nations are so palpable that they plainly point to one common origin. To trace these affinities, however, would of itself fill a volume, and I shall only allude to one or two peculiar ones.

Philologists trace a remarkable connection as subsisting between the modern languages of Europe and the ancient dead languages of the Indian Vedas, thereby tracing the origin of the human race to some probably Asiatic centre.

Throughout the Polynesian Archipelago there are connecting links of language in each Island, showing all the different islanders to be the descendants of one common race. Even in Madagascar are recognized certain Malay and Polynesian words. Important elements of relationship are stated by linguists to be traceable between the native languages of South America and those of the Polynesian family, which suggest a peopling of that part of the continent from Asia through the Islands of the Pacific, and Garnett goes even so far as to show an analogy between them and the languages of Southern India. This subject is largely entered into in the proceedings of the Philological Society, and is too extended except for passing allusion here. The study of the affinity of languages is now leading philologists to anticipate important revelations as to the links connecting the tribes and nations of mankind till they are traced to one original centre, and a determination of the probable lapse of time requisite for the formation of the various sub-divisions now existing.

Writing has also its connecting links. Picture-writing, or the literal figuring of the objects designed to be expressed, merged into the Egyptian hieroglyphics, which, through a natural series of progressive stages, were developed into a phonetic alphabet, the symbols of sounds of the voice. The Indian of to-day, on the far off prairies of the west, chronicles his deeds on the skin side of his buffalo robe and on his birch bark, precisely as his ancestors, centuries ago, painted on the rocks, and this picture-writing, when understood, is remarkably figurative.

In the history of the Indian tribes of the United States, mention is made of a census roll of a band of Chippawas, in Minnesota,

numbering 108 souls, each depicted by a different object, with a series of units simple as those on the Rosetta stone, denoting the numbers of each family, and as intelligible, it is said, to the Indian Agent, as our figures and writing. The object chosen to distinguish a family bears a strange similarity to the crests and heraldic devices of civilized nations.

Humboldt assigns one of the traces of the Asiatic origin of the early races of America, to the connecting link in the symbolic character of their numerals. The four symbols of the seasons among the Aztecs, corresponded precisely with those of the Chinese, Japanese and other Asiatic nations. The Peruvians transmitted to future generations a record of events on a cord of different colored strings, to which others were attached of various colors; yellow, denoting gold and all its allied ideas; white, silver or peace; red, war or soldiers; green, agriculture, and so on. These strings were called a *Quipu*, and a corresponding link to this is to-day to be found among the Indians, in the form of the Wampum belt, used by them for registering their events, and given and received at their treaties as the seal of friendship.

Time will not permit us to dwell longer on ethnological connecting links, and we will now pass on to those of matter, or to speak more plainly, natural history.

It was a remark of Linnæus, that nature takes no leaps, she proceeds by insensible transitions. Mr. Bennett, a rising naturalist, in England, in an article in the Popular Science Review, says: "Classification is now but a human contrivance for tabulating the links in the endless chain which connects all living things." The lines on the chessboard have disappeared and have given place to the imperceptible gradations of the colors of the rainbow. While we can still define red and yellow and distinguish one from the other, we must admit a wide debatable borderland of orange. Even the division of animate nature into the two kingdoms of animal and vegetable life is no longer unchallenged. The last refuge of those who still maintained the essential distinction of the two kingdoms, viz: that the food of animals is organic, whilst that of plants is inorganic, must now be abandoned, and carnivorous or insect-devouring plants hold the position of the connecting link which has hitherto been considered wanting. These plants alluded to in Dr. Hooker's inaugural address before the British Association

rent object, with a stone, denoting the said, to the Indian chosen to distinguish and heraldic devices

siatic origin of the the symbolic character of the seasons among the Chinese, and the transmitted to of different colored colors ; yellow, denoting peace ; red, war the strings were called day to be found belt, used by them at their treaties

an ethnological conflict matter, or to speak

akes no leaps, she a rising naturalist, once Review, says : for tabulating the living things." The are given place to the rainbow. While distinguish one from the land of orange. two kingdoms of challenged. The last distinction of the is organic, whilst ed, and carnivorous the connecting link these plants alluded British Association

in 1874 have been experimented upon in various ways, and the result shows that they absorb through the tissue of the leaf by special organs the material required for their food, and the actual agent in the digestion of insects is a ferment of nature similar to pepsin, which is secreted only during the absorption of some digestible substance. Insects steeped in lithium have been placed on these carnivorous plants, and the roots, when boiled some 30 hours afterwards, afford the colouring matter of the lithium, showing that it has been absorbed and distributed throughout the whole plant tissue.

Up to the year 1837, the efforts of naturalists were chiefly directed towards the perception of differences and the creation of species. But in that year Schleiden told the world, after long research, that as the lowliest members of the vegetable kingdom are each in themselves an individual cell having life and activity, so the highest orders of plants were only congeries of such individuals moulded into a thousand shapes and adapted to different purposes. He enunciated the principle that the story of a plant is to be studied through the vital history of its composing cell elements, and proclaiming the microscopic vegetable cell as the unit of vegetable creation, he exalted it to a place of honor—the key to the cabinet of Vegetable Physiology.

His researches induced Schwaun to apply to the animal world, the same method of enquiry which Schleiden had inaugurated among plants, and he in his turn made known the sublime truth that the law of formation and reproduction which prevails in the vegetable, rules also over the animal creation—the scheme is the same, the cell the element of being. Bones, cartilages, muscles, nerves and every tissue were traced to their origin in cell growth, the universality of which binds all created beings in one sublime connection and proclaims a common law of growth. The vital processes of the body are carried on by cell action ; secretion, absorption, exhalation, nutrition, chemical change and vital change, all indicate only phases in the history of cell life—that epitome of all organic life. But while Schleiden and Schwaun were working amidst the mysteries of structure, Professor Owen took up the question, and what the former had done for structural anatomy, Owen did for the anatomy of form. The man, the bird, the reptile, the fish, the saurian and the monsters of pre-adamite earth seemed to be sepa-

rated by as wide an interval as the lichen from the palm tree. But the secret once fathomed and the type established, their visible connection is read off plain. Owen has satisfactorily demonstrated that by changes of one form alone, the archetypal vertebra, all varieties have been effected, yet all are connected. Some idea of the infinity of life may be formed by a comparison between the microscopic animal, which, when magnified 5,000 times, only appears the size of a visible point, and the huge form of the whale, measuring something like 100 feet; yet all the intermediate space is filled up with animated beings of every form and order, more or less connected; or in the vegetable kingdom by comparing the microscopic mildew with the giant trees of California, and yet knowing that the immense interval is filled with plants, shrubs and trees of every form and size.

One mark of the connecting link of animal life exists in what are known amongst naturalists as rudimentary structures. There is discoverable in all vertebrate animals a general type amidst the diversity of form; there are undeveloped limbs or members which are of no use to the particular animals in which they are found. Apparently functionless and useless where they occur, but representing similar parts of large size and functional importance in other animals, they seem to serve no other purpose than to prevent the gaps in the scale of nature being too large. As examples of these rudimentary structures, I will mention a few: The Rorqual, a species of whale has rounded horny filaments in its jaws, united by a common membrane, in addition to the balaena or whalebone, these filaments apparently corresponding to the teeth of the spermaceti whale. The foetal teeth of the common whale, and of the front part of the jaw of ruminating animals, are minute in size and never cut the gum, but are absorbed without ever coming into use, and no other teeth succeed them or represent them in the adult condition of those animals. The Ornithorhynchus of Australia possessing no teeth, has a horny appendage on each side of either mandible, but without roots, evidently corresponding to teeth in other animals. The Apteryx, a New Zealand bird, utterly incapable of flight, has an almost imperceptible wing in quite a rudimentary condition, yet it contains bones which are miniature representatives of the ordinary wingbones of birds of flight. In the Emu the wings are discernible, and in the Ostrich they become largely developed, although useless as wings proper. The Anacondas and Boas, the largest known

the palm tree. But
ed, their visible con-
y demonstrated that
vertebra, all varieties
idea of the infinity
en the microscopic
appears the size of
le, measuring some-
ce is filled up with
e or less connected;
microscopic mildew
g that the immense
every form and size.
life exists in what are
ures. There is dis-
amidst the diversity
ers which are of no
found. Apparently
representing similar
other animals, they
the gaps in the scale
these rudimentary
, a species of whale
y a common mem-
these filaments ap-
maceti whale. The
at part of the jaw of
cut the gum, but
nd no other teeth
condition of those
essing no teeth, has
dible, but without
her animals. The
of flight, has an
ary condition, yet it
es of the ordinary
ngs are discernible,
d, although useless
the largest known

species of serpents, have beneath their scaly coats two elementary extremities, rudiments of the organs of locomotion, just anterior to the base of the tail, and in which are found a series of bones representing those of the hind limbs of Mammals. These rudiments, though imperfectly developed, are yet acted upon by powerful muscles, and thus become a strong fulcrum in the animals' movements or in seizing their prey. We may pass from lizards to serpents through a continuous series of forms in which the limbs become more and more feeble, until all external traces of them are lost. Such, for instance, are the family of Chalcidae, one of which, the *Pseudopus*, found in Northern Africa and Greece, has only the rudiments of hind limbs; whilst another, the *Chirotes*, a native of Mexico, has only the fore limbs, placed a short distance behind the head, yet so developed in its case as to be used. In the family of *Scincidae*, the *Evesia*, a native of India, has the limbs reduced to footless appendages. In the common slow worm or blind worm, rudimentary limbs are found beneath the skin on dissection.

In a species of Turtle, the *Matamata*, found in Guiana, rudimentary ears or ear-like membraneous prolongations of skin on the head exist. Again, at the inner corner of the human eye is a third eyelid, known, I have no doubt, to very few persons, and an object of attention only to anatomists. In other animals, birds especially, it is of full size and of great utility, enabling them to turn their eyes upwards to the sun, a feat they could never accomplish were not the visual organ thus protected.

A curious animal has been discovered in the Amazon, called the *Lepidosiren*, with the scales and mucous covering of a fish, but with rudimentary limbs, represented by four tentacular appendages, not jointed. Another species is met with in South Africa, with the tentaculæ jointed.

Professor Owen, speaking of rudimentary forms, thinks that we have not in this globe all the diversities of which a general pattern or archetype is susceptible, and that limbs which are found only in an undeveloped state in this world, may be fully developed in the other planetary bodies. Arguing on this principle, Dr. Leitch, in his work, "God's Glory in the Heavens," says there are undeveloped volcanic structures on the face of the earth, similar ones to which have long ago been fully developed in the moon, and by analogy he

shows a connection between the geological formation of the earth and that of its Satellite.

Although in the more recent geological formations, there are numerous fossils met with corresponding to similar living species, few, very few, are the existing types or links connecting the present with the earlier geological periods. The few that occur to me I will allude to. The "Gar-pike," or Bill-fish of our Canadian waters, comparatively rare here, but abundant in the West, helmeted and mailed in almost impenetrable scale armor, with its jaws hinged similar to the Alligator, and its vertebræ of the regular ball and socket formation, points to a close affinity with the Saurians and the fossil Ganoids of Agassiz. The Trilobites have long since ceased to exist, but in the Antarctic Ocean science has brought to light a curious crustacean, (*Glyptonotus Antarcticus*), which strongly recalls the extinct form of the Trilobite. The Crinoids and Encrinites of the Palæozoic world, have a link remaining extant in the pentacrinus of the Caribbean Sea, with its delicate strong stem, bearing on its summit a symmetrical cup or body, around the margin of which are supported five strong arms, which ramify into scores of fingers. The whole structure is composed of thousands of little stony pieces, fitted together with mathematical precision. The fossil plants of our coal measures have their existing links in the arborescent ferns of Australia; the lowly club moss of our own woods and the diminutive equisetum of our swamps, and the tangled thickets of tropical morasses; but the majority of the early forms of creation, having fulfilled their work have passed away, leaving no existing type or link to be associated with their story record in the rocks.

There are many apparent connections between animal and vegetable life, or between different orders of *animals* which are apt to mislead a novice from their similarity to a transition state. Such, for instance, is the Sea Anemone, presenting all the colors, hues and appearance of the flower of that name, though belonging in reality to the animal kingdom. The same remark applies to the Sponge, which, though apparently growing at the bottom of the sea like a plant, is now acknowledged to be of animal growth and allied to the coral builder. The *Ornithorhynchus* of Australia, an animal possessed of the bill of the duck, and with webbed feet, is not a connecting link as once was thought between beasts and birds, although possessing certain properties of both. That the Armadillo is a link

between
what r
coat of
Tortoi
side th
ignorant
and m
called
only fr
when
E
Natura
granted
Tur
the par
by tho
to the
from th
possess
organ i
or part
either
form, o
which
row of
them,
the bo
to inte
interm
of little
only tw
us to
attenti
stamen
as per
cisely

In h
be use
exclus

between animals and reptiles, viz: the Tortoise which it somewhat resembles, is another popular error, for the Armadillo has a coat of mail, implanted as it were on the skin, whilst the shell of the Tortoise is part of the skeleton extended, and as it were thrown outside the body for the protection of the internal organs. The Bat, ignorantly asserted by many to be a connecting link between birds and mammals, belongs exclusively to the latter as much as the so-called flying squirrel, and the flying fish has acquired that name only from the impetus it gains by its fins in leaping out of the water when pursued by larger fish, the fins not being used as wings at all.

Errors like these have to be guarded against by the student of Natural History, and, where possible, nothing should be taken for granted without examination.

Turning to the vegetable kingdom we find the mutual relations of the parts of the flower and their homology with the leaves indicated by those cases in which there is a gradational passage from the leaf to the bract, from the bract to the sepal, from that to the petal, and from the petal to the stamen. The non-development of some organ possessed by neighboring groups is manifested by the presence of that organ in a rudimentary or undeveloped condition. When the whorl, or part of it, in a flower is suppressed, the deficiency is manifested either by the presence of the undeveloped organs in rudimentary form, or by leaving a space for them in the arrangements of the parts which are present. Thus, in the Primrose tribe, there is a single row of stamens opposite to the petals, instead of alternately with them, according to the regular plan of floral development, from which the botanist concludes that a whorl has been suppressed, which ought to intervene between the petals and stamens. The rudiments of an intermediate row are found in the *Samolus* in the form of a whorl of little scales, not developed into stamens. In the common Sage, only two stamens are found where the plan of the flower would lead us to expect five; but on looking at the interior of the corolla attentively, two little scales may be seen where the two deficient stamens should have been. These scales are frequently developed as perfect stamens in flowers, which otherwise are constructed precisely like the Sage.

In botany, however, the term transition might more appropriately be used than connecting links. The Algae, or water weeds, vegetate exclusively in water or damp situations. Their nearest representa-

tive on land is the lichen, growing on rocks, trunks of trees and other hard substances, and deriving its nourishment from the atmosphere. Some of these approximate to the Algae, some to the Fungi, and whilst some botanists rank them with one, and some with the other, it seems reasonable to regard them as an intermediate section—a connecting link. Next come the Liverworts, Mosses and Ferns, passing so gradually from one to the other that the connection is apparent to all when closely examined. For instance, the Liverwort begins to assume the structure and aspect of a leaf, and has an indication of a central midrib; Moss has a distinct axis of growth more or less erect, in which the elongated cells seem to prefigure the wood of plants. There is no actual root, but radical appendages are put forth from every portion of the lower part of the axis, and even from the under surface of the leaves. The Mosses, known as Stag's Horn, Club Moss and Tree Moss, closely assimilate to the lower forms of the Ferns from which they are hardly distinguishable. The Tree Fern possesses a stem round which leaves are symmetrically arranged, and has a proper descending root; in the case of some of the Fern tribe, particular fronds manifest themselves from the rest of the leaves as fertile or spore-producing. In this departure is seen the tendency towards a flowering plant, which the next class in succession, the Equisetum, fairly merges into. From that upwards there is no difficulty in tracing the gradation which connects in the end the mightiest monarch of the forest with the tiny growth of vegetable mould, discernible only under the microscope.

In the early part of this lecture I spoke of man as the highest known state of organized life. Whether he is a connecting link with a higher race of beings is not known, but this much we do know, that though in structure and functions he ranks as belonging to this sphere, yet by his intellect and reasoning powers he approaches those chosen creatures who are represented as shining near the Throne of the Eternal and form a bond of union between heaven and earth. By the exercise of his genius man elevates himself towards that Supreme Being in whose likeness he was fashioned; by giving scope to his passions, he debases himself to the lower orders of life to which he is akin.

Having now cursorily traced connecting links as they may be seen in our daily intercourse with nature and in our study of history, it remains for me only to allude to the great final connecting link,

which,
link be
in a sc
we hav
body i
real d
force—
with t
a dead
where,
another
and ag
During
of con
sentien
matter
state—
anew
scienti
a subj
that fu
now i
man c
T

fully e

ks of trees and other
t from the atmos-
some to the Fungi,
and some with the
intermediate section
Mosses and Ferns,
the connection is
ance, the Liverwort
leaf, and has an in-
inct axis of growth
eem to prefigure the
radical appendages
rt of the axis, and
Mosses, known as
y assimilate to the
dly distinguishable.
aves are symmetri-
t; in the case of
st themselves from
In this depart-
ant, which the next
s into. From that
tion which connects
th the tiny growth
microscope.

man as the highest
a connecting link
t this much we do
ranks as belonging
ng powers he ap-
ted as shining near
of union between
man elevates him-
s he was fashioned;
nself to the lower

anks as they may be
ur study of history,
al connecting link,

which, if I may so use the term, is miscalled death—the connecting link between this and a future state of existence. A recent writer in a scientific journal says: "On earth we have no veritable death, we have only change of form and condition." What we call a dead body is not dead—an Egyptian mummy even tries hard to attain a real death in vain, but it corrupts, it decays. Corruption is a force—a potent agent, the harbinger of life to come. Assimilated with the elements of which it was composed, the organic matter of a dead body is absorbed and reproduced, we cannot tell when or where, for one form of matter is continually taking the place of another in everything. Animal and vegetable remains are changed, and again become part of the earth of which they were composed. During life the body is continually changing; death is only a loss of consciousness and a cessation of action in the intellectual and sentient being; it is not a loss of existence, for not a particle of matter ever ceases to exist, but it is the change—the transition state—which the body must undergo previous to its being created anew into other forms of existence. I speak here simply from a scientific view apart from a doctrinal one; the future of the soul is a subject for other hands and another place than this, but even of that future, death is still a connecting link between the sphere we now inhabit and some other region far away, of which the mind of man can form no conception.

The idea of looking on death as only a change, is thus beautifully expressed by Lord Lytton:

"There is no death; the dust we tread
Shall change beneath the summer showers
To golden grain or mellow fruit
Or rainbow tinted flowers.
There is no death; an Angel form
Walks o'er the earth with silent tread,
He bears our best loved things away,
And then we call them dead.
He leaves our hearts all desolate,
He plucks our fairest, sweetest flowers;
Transplanted into bliss, they now
Adorn immortal bowers.
Born to that undying life,
They leave us but to come again,
With joy we welcome them the same,
Except their sin and pain;

And ever near us, though unseen,
The dear immortal spirits tread,
For all the boundless universe is life—
There are no dead."

